

PETROPORT CORP.

IBLA 88-74

Decided June 26, 1989

Appeal from a decision of the Wyoming State Office, Bureau of Land Management, increasing the rental rate for noncompetitive oil and gas lease W-86905.

Affirmed.

1. Oil and Gas Leases: Burden of Proof--Oil and Gas Leases: Known Geologic Structure

Delineation of a KGS recognizes the existence of a continuous entrapping structure, on some part of which there is production, or of numerous related, but nevertheless independent, stratigraphic or structural traps. An appellant challenging a KGS determination must either show that the producing structure does not underlie the land or affirmatively establish that the structure in question is not productive in the land in question.

APPEARANCES: Philip W. Shayne, Vice President, Petroport Corporation, for appellant; Lowell L. Madsen, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Denver, Colorado, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE MULLEN

Petroport Corporation (Petroport) has appealed from an October 1, 1987, decision of the Wyoming State Office, Bureau of Land Management (BLM), increasing the annual rental rate for oil and gas lease W-86905 because a portion of the lands subject to that lease was within the Manderson Known Geologic Structure (KGS), as designated on August 18, 1987.

Noncompetitive oil and gas lease W-86905 was issued effective June 1, 1984. BLM issued this lease pursuant to the provisions of section 17 of the Mineral Leasing Act, as amended, 30 U.S.C. | 226 (1982), and regulations at 43 CFR Subpart 3112. 1/ By memorandum dated August 28, 1987, the Associate

1/ Section 17 of the Mineral Leasing Act was subsequently amended by section 5102(a) of the Federal Onshore Oil and Gas Leasing Reform Act of 1987, P.L. 100-203, 101 Stat. 1330-256. All references to the Act are to the Act as in existence before this amendment.

District Manager, Worland District Office, notified the Director, Wyoming State Office, BLM, that lands within this lease were included in an August 18, 1987, addition to the Manderson KGS. ^{2/} In its October 1, 1987, decision, BLM notified appellant that the rental rates would be increased "[b]eginning with the lease year which starts at least 30 days from receipt of this notice." The increase described in the decision was from \$1 to \$2 per acre or fraction thereof through the fifth lease year and from \$2 to \$3 per acre for subsequent lease years. Appellant has appealed from this decision, alleging error in the KGS expansion decision.

A Geologic Report for the Manderson KGS, dated August 18, 1987 (Geologic Report), was prepared by BLM Petroleum Geologist Jeanne Celmer-Bricmont. This Geologic Report was the basis for expanding the Manderson KGS to include the land embraced by appellant's lease. The expansion of the KGS is explained in part as follows:

The Manderson Known Geologic Structure review was initiated due to the completion of a producing well outside the KGS boundary. This well, the Kaneb Oil and Gas No. 2-36 State, SE1/4 SW1/4 Section 36, T50N, R92W, was completed February 21, 1986 for 7 barrels of oil per day from the Ocith Louie member of the Cretaceous Mowry Shale from 3768 to 3792 feet.

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The Manderson structure is a northwestward plunging, asymmetric anticline; however there is no closure along the anticline to facilitate the trapping of hydrocarbons. The oil and gas accumulation in all producing horizons is due largely to stratigraphic trapping with structure playing a small role. Plate 1, a structure map at the top of the Phosphoria, illustrates the anticline.

Ocith Louie Sandstone. Five wells located on the southern end of the structure produce from the Ocith Louie. This sandstone was also tested in two other wells, recovering gas cut mud (Union Oil Manderson No. 6, NE1/4 NE1/4 Sec. 2, T49N, R92W and Mobil F-31-11-G, NW1/4 NE1/4 Sec. 11, T50N, R93W). Few porosity logs were available, therefore an effective porosity map could not be constructed. Resistivity data were used to approximate the relative distribution of clay within the sandstone body. According to Curry (1972), in many sandstone stratigraphic traps, resistivity mapping provides a better understanding of the distribution of hydrocarbon reserves. It was determined from the producing wells that a sand with a resistivity equal to or greater than 20 ohms was capable of production. An isopach map was constructed to illustrate the distribution of those sand thicknesses with

^{2/} Appellant's oil and gas lease embraced approximately 280 acres described as: Sec. 11, SW¹/₄ SE¹/₄; sec. 14, W¹/₂ W¹/₂, SE¹/₄ SW¹/₄, SW¹/₄ SE¹/₄, T. 49 N., R. 92 W., sixth principal meridian, Big Horn County, Wyoming.

resistivities greater than or equal to 20 ohms, thus approximating the extent of the oil reservoir in the Oath Louie (Plate 2).

Muddy Sandstone. Fifteen wells are presently producing or have produced one of the three benches of the Muddy sand. Thirteen wells produce from the second bench, with two of these wells also having perforations extending into either the 1st or 3rd bench. Two other wells produce solely from the 3rd bench. The second bench of the Muddy consistently exhibits the best reservoir quality and represents most of the Muddy production. As most Muddy traps result from a permeability decrease associated with a sandstone pinchout (Larberg, 1980), resistivity mapping was again used to determine the approximate extent of the reservoir. The Muddy was mapped using a 25 ohm cut-off (Plate 3). Based on data from producing wells, sands with a resistivity of 25 ohms or greater were determined to be capable of production. NOTE: Well in NE1/4 SE1/4 Sec. 24, T50N, R93W shows 0 feet of 25 ohm sand in the second bench of the Muddy although it produces from the third bench of the Muddy.

(Geologic Report at 1-2).

BLM extended the boundary of the Manderson KGS based upon its isopach map of resistivity of the Muddy formation. BLM explained that among the dry holes within the productive limits of the KGS was a well in the NW¹/₄ SW¹/₄, sec. 14, T. 49 N., R. 92 W. (the Champlin No. 1 Government Aztec), which had no tests in the Muddy formation.

In its statement of reasons (SOR) on appeal, Petroport states that it is not aware of any Muddy formation core analysis for wells drilled in township 49, and contends that BLM's use of isopaching electric-log resistivity to determine presumable productivity of the lands in the expanded Manderson KGS is erroneous. Appellant states that electric logs do not reflect permeability, and that permeability can be determined only by core analysis. Appellant concedes that mapping log resistivities can be used to delineate exploration targets because low resistivity commonly indicates water-bearing formations and higher resistivity can indicate the presence of hydrocarbons. Appellant contends, however, that:

In the Powder River basin, * * * tight clay-filled Muddy sandstone reservoirs commonly have low resistivities and appear water bearing. The reason for this is that the resistivity curve is reflecting the connate water in the molecular composition of the clay and, in the absence of formation fluid, will give false "wet looking" appearance. Conversely high resistivity readings indicate two possibilities: the presence of hydrocarbons or a tight reservoir lacking porosity. Thus the resistivity by itself is not a meaningful parameter without comparing its characteristics with other available log data. [Emphasis in original.]

(SOR at 2).

Appellant has submitted exhibits with its appeal and asserts that these exhibits prove the fallacy of BLM's contention that electric-log resistivity testing is an accurate measure to determine the presence of hydrocarbons. In furtherance of this assertion, appellant contends the well logs from the Champlin No. 1 Government Aztec well, located in sec. 14, T. 49 N., R. 98 W., give clear evidence of the fallacy of BLM's conclusion. Appellant states:

Exhibit III is a section that meets the BLM's parameter of having resistivity over 20 ohms. Consequently, according to their conclusion it must be productive. The section from 7542' to 7566' admittedly looks productive; it has excellent resistivity and, in addition, has [spontaneous potential] curve deflection indicating the possible presence of formation fluid. More than likely it also had oil shows in the drill cuttings which was the basis for the request from the wellsite geologist to test the zone. Drill stem test recovery, however, was 5600 feet of water without any hydrocarbons. This recovery would be unexplainable by the BLM method. However, when the acoustilog is compared with the induction log it is apparent that the "promising resistivity zone" lacks porosity and the water must be coming from the low resistive zone from 7572' to 7606' which was included in the drill stem test interval.

Exhibit IV is the Phosphoria log section from the same well. Again, based on the induction log, the zone looks very promising. Not only is excellent resistivity present but there is strong SP deflection indicating a clean, porous reservoir. A drill stem test over this interval, however, recovered only 240 feet of slightly gas cut mud. The abnormal flow and shut in pressures indicate that the formation lacks permeability. Again, no hydrocarbons (of any significance) were recovered.

(SOR at 2).

Appellant also contends that the log from the Champlin well shows a reversed spontaneous potential curve in two areas, indicating that the formation fluid is fresher than the drilling mud, and that the Muddy zone is water-bearing rather than productive. Appellant asserts that to include its tract within the KGS boundaries because the Champlin well owners failed to test the Muddy zone is a negative approach, and this failure does not indicate that the zone is productive. Finally, appellant contends that the Champlin No. 1 Government Aztec shows no prospective horizons in the Mowry, Frontier, Tensleep, or Phosphoria formations and is incapable of producing hydrocarbons.

A BLM geologic report responding to Petroport's statement of reasons was submitted with its answer. BLM contends that electric-log resistivity can reflect permeability, and the relative distribution of clay within a sandstone body can be approximated by mapping maximum log resistivity. Admitting core-data analysis provides a more accurate permeability value, BLM notes that available core data was incorporated in the initial study. BLM states that a sufficiently accurate approximation of the distribution

of hydrocarbon reserves was achieved by mapping the resistivity of the Muddy Formation. BLM admits that the failure to test the muddy zone in the Champlin well made it impossible to positively determine whether the Muddy formation was capable of production at that site, but contends that an examination of the resistivity parameters for wells which have produced from the Muddy Formation led to a reasonable conclusion this area should also be made a part of the Manderson KGS. Responding to the assertion that a reverse spontaneous potential (Appellant's Exh. V) is indicative of a water-filled zone, BLM states that a fresh water showing would normally result in a more dramatic reversal than that exhibited in the Champlin No. 1 Government Aztec well log.

[1] A KGS is defined as "technically the trap in which an accumulation of oil and gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive" 43 CFR 3100.0-5(l). Delineation of a KGS recognizes the existence of a continuous entrapping structure, on some part of which there is production, or of numerous related, but nevertheless independent, stratigraphic as well as structural traps. Celeste C. Grynberg, 106 IBLA 219 (1988); Thunderbird Oil Corp., 91 IBLA 195 (1986), aff'd sub nom., Planet Corp. v. Hodel, Civ. No. 86-679 HB (D.N.M. May 6, 1987).

An appellant challenging a KGS determination must either show that the producing structure does not underlie the land or affirmatively establish that the land involved is not productive from the structure in question. Id. A party challenging a BLM determination placing lands within a KGS has the burden of establishing by a preponderance of the evidence that inclusion of the land is erroneous. Bender v. Clark, 744 F.2d 1424, 1429-30 (10th Cir. 1984); Carolyn J. McCutchin, 103 IBLA 1 (1988); Thunderbird Oil Corp., supra at 201.

The Secretary of the Interior has delegated the responsibility for determining the existence and extent of KGS's to his technical experts in the field. When these technical experts make a determination that lands should be included in a KGS, the Secretary is entitled to rely upon their reasoned opinion. Thunderbird Oil Corp., supra at 202; Champlin Petroleum Co., 86 IBLA 37, 40 (1985). The technical expert's determination will not be set aside when it is not arbitrary and capricious and is supported by competent evidence. Lowell J. Simons, 104 IBLA 129, 131 (1988); Thunderbird Oil Corp., supra.

The Manderson KGS is a stratigraphic rather than structural trap. In previous cases we have acknowledged that KGS determinations for stratigraphic traps are more problematic. See, e.g., Thunderbird Oil Corp., supra at 202. Appellant essentially argues that electric-log resistivity testing should not be used to determine whether lands are presumptively productive. We believe that, in this case, BLM has adequately refuted appellant's claim. As noted by BLM, the resistivity logs of the Chugwater and Phosphoria formations at the Champlin No. 1 Government Aztec submitted by Petroport do not appear to be applicable to an analysis of the Muddy formation. The Chugwater and Phosphoria formations, which were either not studied or exhibited completely different lithology and reservoir characteristics from the Muddy

formation, occur approximately 1,000 feet above the Muddy formation. BLM has submitted sufficient evidence that the Champlin No. 1 Government Aztec dry hole does not necessarily support a finding that the Muddy formation is not presumptively productive. Appellant has not shown BLM's interpretation to be in error. Therefore, we conclude that appellant has failed to show by a preponderance of the evidence that the lands it leases are not properly included within the KGS.

Accordingly, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed.

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R. W. Mullen
Administrative Judge

I concur:

Gail M. Frazier
Administrative Judge